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Lower Snake River Fish and Wildlife Compensation Plan

by

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ABSTRACT

Anglers expended an estimated 39,522 hours to harvest 15,090 residualized steelhead averaging 9.0 in. total length from the upper Salmon River during the time period May 25 through July 23, 1985. It was estimated that 2.2% of the 786,186 normal-sized steelhead planted in the upper Salmon River became residualized compared to 1% for 1984 with normal-sized smolts and 13% for larger smolts.

Stocking methods evaluated in 1985 appeared suitable for needs. No excessive descaling on planted steelhead smolts was observed.

Stream surveys revealed limited potential for spawning in Allison Creek in 1985. A barrier to upstream migration was observed. Some steelhead spawning was noted in Little Slate Creek. Good habitat and riparian vegetation was noted in Slate Creek. A number of other tributaries in the lower Salmon River were studied as potential outplant sites for steelhead.

Juvenile density counts were made by snorkeling in Slate Creek and Whitebird Creek in the summer of 1985. In Slate Creek, the number of steelhead parr per 100 square yards ranged from 4.3 in section 4 to 76.5 in section 5. The mean number of parr per 100 square yards was 18.8. In Whitebird Creek, the number of steelhead parr per 100 square yards was 25.9, 57.3, and 20.5 for study sections 1, 2, and 3, respectively.

Documentation of Lower Snake River Hatchery programs is provided in this report including: juvenile fish output, return of adults to facilities, and oversight of major hatchery programs.

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INTRODUCTION

In Idaho, there are currently fish rearing operations under the Lower Snake River Compensation Plan (LSRCP) at McCall Hatchery, Dworshak National Fish Hatchery, Hagerman National Fish Hatchery, and Sawtooth Hatchery. Magic Valley Steelhead Hatchery is under renovation, and the proposed Clearwater Hatchery is in the planning stages (Fig. 1).

The success of each hatchery program will be determined ultimately by the number of returning adults, whether it be to the hatchery or to outplant sites. Many factors affect the return of adults: mortality due to stress at time of planting, time of release, length at release, residual ism, commercial and sport fishing, environmental impacts, and most importantly, mortality at the dam sites for both downstream migrating smolts and upstream migrating adults. Passage at the dams has been improving, but increases in survival by reducing stress occurring during transportation or releasing the smolts at the optimum time and at the optimum length, or reducing the number of smolts that residualize, could improve the number of returning adults. Investigation of these opportunities to reduce unnecessary mortality is a major goal of this study.

Reduction of mortality due to stress caused by transportation is an area just beginning to be evaluated in Idaho. Most of this stress is due to the increase of metabolic wastes (ammonia, urea, uric acid, carbon dioxide), as well as other chemicals, in the hauling water. Leitritz and Lewis (1980) list four methods to reduce the effects of accumulating waste products:

1. Starvation of fish 24 to 48 hours prior to transportation.
2. Maintenance of low water temperatures.
3. Use of hypnotic drugs.
4. Removal of metabolic waste products through aeration and chemical buffers.

The method that has received the most investigation, recently, has been the use of hypnotic drugs. Hattingh et al. (1975) reported that survival rates for warmwater species were increased by the addition of 10% NaCl solution to the hauling water. Other researchers (McFarland and Norris 1958; Wedemeyer 1972; Long et al. 1977; Carmichael et al. 1983; Wedemeyer et al. 1985) have investigated the effects of various mineral salt solutions and tricaine methane sulfonate (MS-222) on survival of transported fish. Wedemeyer et al. (1985) reported that 10 ppm of MS-222 was the best solution for hauling juvenile chinook salmon. He also suggested the benefits of using mineral salts may be negated by the corrosion of the equipment.

In the past, Idaho hatcheries have not used water treated with stress reducing solutions to haul anadromous fish (Steve Huffaker, personal communication). There is a need to determine if the successes reported by other agencies can significantly increase the number of adult steelhead and salmon returning to Idaho waters.

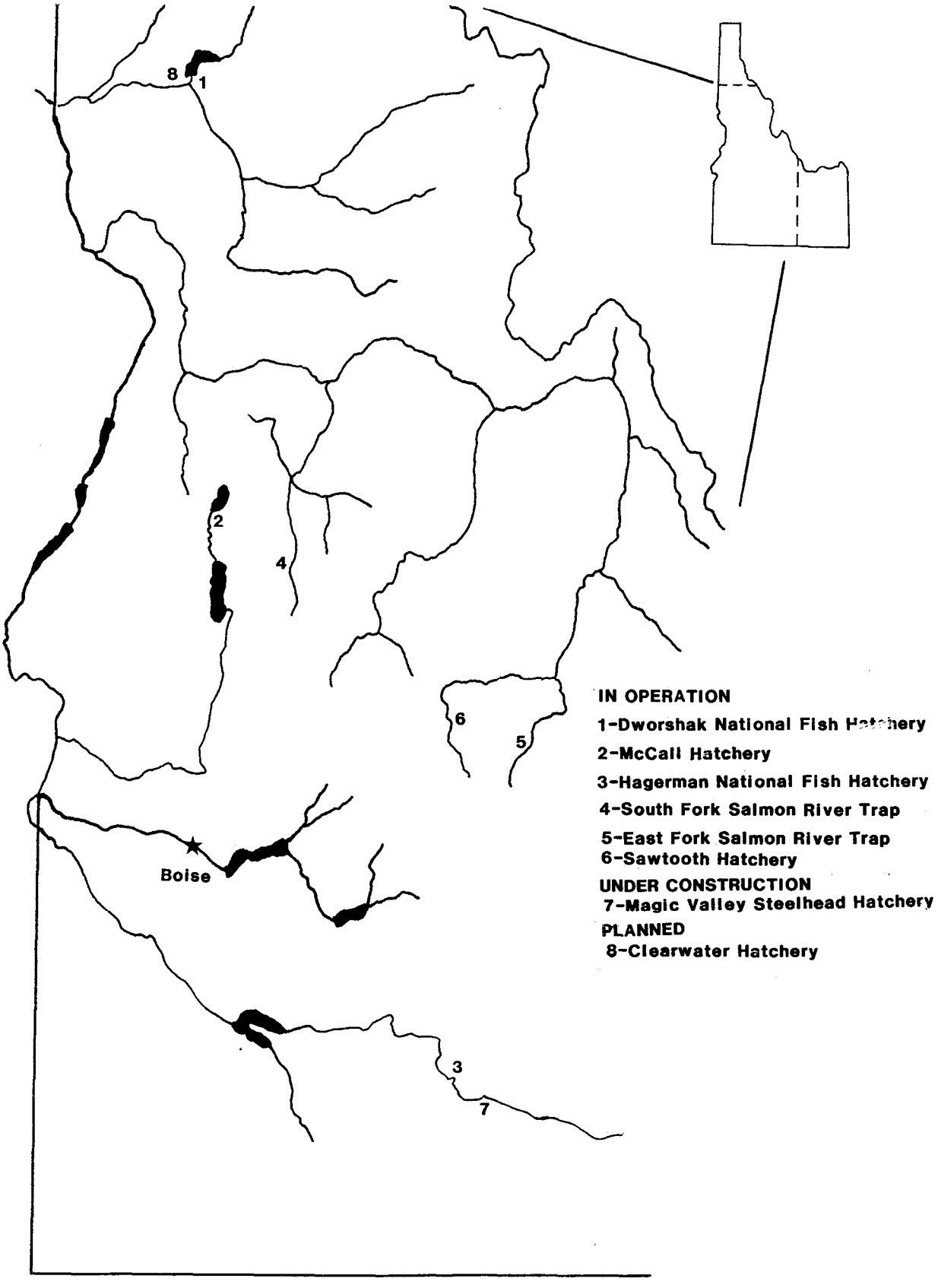

Figure 1. Location of Lower Snake River Compensation Plan facilities in Idaho.

Time of smolt releases appears to be another critical factor affecting migration success. Smolt migration occurs from April through June with peak migration occurring between mid-April through mid-May (Chrisp and Bjornn 1978). This time frame usually corresponds to peak spring runoff. Each subgroup of smolts, as well as each release site, may have a precise optimum time for release. Determination of this critical time is necessary for each smolt group and outplant site to ensure maximum number of returning adults. Length at time of release is also critical to the number of smolts that migrate (Chrisp and Bjornn 1978; Bjornn et al. 1979; Reingold 1979). The parr-smolt transformation occurs most often between 140 mm and 180 mm (TL) (Wagner et al. 1963; Chrisp and Bjornn 1978). Partridge (1985) determined that length of smolts does effect downstream survival. Therefore, continued monitoring of smolt length at time of release is necessary.

Length at time of release also seems to affect the percentage of smolts that residualize, which may ultimately affect the number of returning adults (Chrisp and Bjornn 1978). Partridge (1985) suggests residualism as high as 29% (based on estimates extracted from Chrisp and Bjornn 1978) could occur. Partridge (1985) estimated 80% of residual smolts were male and that 72% of these were Immature.

Another phase of hatchery oversight is to determine the success of smolt outplants at sites that do not have permanent collection facilities. Therefore, it is necessary to determine the number of returning adults through the use of temporary collection facilities. Because one of the goals of the LSRCP is to increase anadromous fish runs to preproject levels, it is necessary to determine the success of spawning of hatchery adults. This may be accomplished through juvenile density counts (Johnson 1985, Thurow 1985). When a stream becomes fully seeded, the decision to transfer smolt outplants to other suitable sites could be made. This knowledge (number of returning adults and corresponding juvenile density estimates) is necessary to best utilize the limited resources.

OBJECTIVES

1. To provide a documentation of the LSRCP funded fish-rearing activities in Idaho and the resulting adult returns.

2. To develop and provide an ongoing evaluation of major operational guidelines of LSRCP hatchery activities in Idaho.

3. To provide an oversight of major hatchery operational practices.

4. To coordinate research and management programs with hatchery capabilities.

RECOMMENDATIONS

1. Continue smolt plants in Slate Creek at the same rate as 1983 and 1984 (32,000 yearly).

2. Reevaluate anadromous fish planting in Allison Creek due to apparent fish passage problems.

METHODS

Residualized Steelhead Sampling

To monitor residualized steelhead, angler surveys were made on a 40-mile reach of the Salmon River and on the lower six miles of Valley Creek (Table 1). This section of the river meanders through the lower portion of the Sawtooth Valley and is further described in Partridge (1985).

Steel head smolts remaining in the release area in excess of a month were considered residualized fish. These fish were sampled during the two four-week intervals to determine the numbers of residualized fish, length of time they remained in the system, dispersal from the release site, and size ranges of the residualized steelhead. The sampling method consisted of a stratified random angler survey.

The survey began with the opening of the fishing season on May 25 and continued through July 23, 1985. The survey was stratified by four-week intervals, by day type (weekday, weekend, and holiday), and by stream location. Weekends which occurred in conjunction with a holiday were considered as holidays. Within each interval, 50% of the weekends, 40% of the weekdays, and all holidays were selected as count days. Each day was partitioned into four equal count periods, and four counts were conducted over each two-day period. Count periods were selected so that each different period type (early morning, late morning, afternoon, evening) received one count during the two-day period. Counts were made by driving along the length of the study area and counting angler vehicles. Vehicles in campgrounds were not counted unless a party was observed fishing.

Calculation of effort and harvest for each interval was calculated using the methods described by Rieman (1983) with a modification for vehicle counts (B. Rieman, IDFG, personal communication). Mean angler vehicles per day for each study section in each interval was calculated as:

$$Y_1 \quad \frac{1}{N} \quad \sum_{1=1}^{L} N_1 \quad Y_1$$

Table 1. Location and length of angler harvest survey study sections on the upper Salmon River.

Study section	Section boundaries	Length miles
U3[a]	Pettit Lake road on Alturas Lake Creek and county line bridge to Hell Roaring Creek	4.1
U2	Hell Roaring Creek to Williams Creek	7.5
U1	Williams Creek to 110 yards above release site	2.6
R	110 yards above and 110 yards below release area	0.1
D1	110 yards below release area to steel bridge	3.1
D2	Steel bridge to Valley Creek	7.2
D3	Valley Creek to Basin Creek	8.4
D4	Basin Creek to Sunbeam Dam	5.4
V	Valley Creek from Stanley Lake Creek to the Salmon River	6.5

[a]Includes both lower Alturas Lake Creek and a portion of the Salmon River.

where: N_1 = the number of days per day type 1,
Y_1 = the mean number of angler vehicles per day type 1, and
N = the total days in the interval (28).

The total angler hours for each section in each interval were estimated as:

$$T1 = YI\ Ai\ D_i$$

Total effort for the interval and for the season was estimated as the sum of the study sections and the sum of the intervals.

Smolt Outplant Monitoring

Steelhead smolt plants were made in East Fork Salmon River and Hazard Creek between March 20 and April 30, 1985. All stock originated at Hagerman National Fish Hatchery. All hatchery-reared smolts were given an adipose fin clip to distinguish them from wild stocks. Groups of approximately 20,000 smolts were tagged with a coded wire tag inserted into the snout of the fish. The tagged smolts had a left ventral fin clipped to indicate a coded wire tag.

It was necessary to tag a sample of each experimental group of smolts planted to determine the percentage of returning adults. Test groups released in 1985 include time of release tests for steelhead smolts and transportation tests. One tagged group was hauled in a 5% isotonic saline solution (pro polyaqua), and another group was freeze branded (not tagged). A sample of 300 smolts from each tagged or freeze branded group released in 1985 was measured for total length. Tag returns from these plants will be totaled over the next four years and reported in future yearly reports.

In addition, steelhead smolts were checked on two occasions for descaling using methods described by Scully (1983). Samples were taken during stocking at the East Fork trap and at Sawtooth Hatchery. Various smolt outplant sites and potential outplant sites were also evaluated in 1985. Observations were generally qualitative in nature and included observations of presence of major barriers, substrate evaluations, riparian habitat, and general habitat conditions that could limit the size and scope of planting. Evaluations were made as time allowed and are by no means complete..

Adult Steel head and Redd Counts

Two streams, Slate Creek and Allison Creek, were sites of steelhead B smolt plants in 1983 and 1984 from stock reared at Dworshak National Fish Hatchery. Adult one-ocean fish were expected to return this year (1985) to these streams. Detection of returning hatchery and wild adult steelhead was made by observing selected areas of the stream

every other day beginning April 10, 1985. Observations for Allison Creek were made along the lower 0.5 mile of stream. Observations for Slate Creek were made along the lower 13 miles of stream with the effort concentrated in stream miles 10-13. An attempt was made to determine if observed adult steelhead were wild or hatchery stock. Dates and times of observation were recorded. Number and locations of steelhead redds were also recorded.

Juvenile Density Counts

Snorkeling has been shown to give accurate estimates of steelhead parr (Griffith et al. 1981; Edmundson et al. 1968; Schill and Griffith 1984; Northcote and Wilkie 1963; Goldstein 1978; Thurow 1985; Johnson 1985). The snorkeling technique used to count parr was similar to that described by Thurow (1985). One or two passes, depending on visibility and stream width, were made by one or two divers moving upstream. The observed fish were divided into 3-inch length groups between 0 and 12 inches and counted for each species present.

These counts were conducted on two streams, Slate Creek and Whitebird Creek. Five study sections were selected on Slate Creek: two sections were selected in the main stream, one near the mouth, one near the confluence of main Slate and Little Slate, and the fifth section was located in Little Slate Creek Meadow. Three sections were selected in Whitebird Creek, one section was on each of North Fork and South Fork Whitebird creeks near their confluence and the third was located near Twin Cabins on the South Fork Whitebird Creek (a meadow area). Each section was selected for ease of access and for representative habitat. The length of each section was approximately 10 to 15 times the mean stream width. Width measurements were taken every 10 yards. The type of habitat (pool, run, pocket water, or riffle) was determined for the right, left, and middle sections of the stream along the width measurement transect. Other data collected for each section included: substrate composition, gradient, vegetation, land use, and total area.

Juvenile densities and fish per square meter were calculated for each length group of each species and for the total number of fish counted in each study section.

Little Salmon River - Residualism

Steelhead smolts were planted in Hazard Creek, a tributary of Little Salmon River, 10 yards above the confluence. Angler interviews were conducted from May 25 to June 25, 1985. Data recorded included total length and presence of adipose or left ventral fin clips.

Hatchery Oversight

Oversight of hatchery operations was again a major project goal in 1985. Hatchery facilities are fully described by Partridge (1984) and Rohrer (1985). Much of the information for this section of the report was provided by the respective Hatchery Superintendents. In addition, several trips to LSRCP facilities were made in 1984-85, and regular coordination meetings are held each year.

RESULTS AND DISCUSSION

Residualized Steelhead Sampling

A total of 786,186 "A" strain steelhead were released into the upper Salmon River at Sawtooth Hatchery during 1985. Included in this total was a coded wire tagged group (10/26/30) of 40,475 steelhead (mean TL = 8.4 in.) released on April 9. An estimated 15,090 steelhead were harvested by anglers during the angler survey period (May 25 through July 23) in 1985 (Table 2). Partridge (1986) estimated that 86% of the total harvest occurred during the first two months of the season. Therefore, we estimated that as many as 17,546 steelhead smolts could have been harvested in 1985.

The residualism rate was estimated at 2.2% for steelhead planted in the upper Salmon River in 1985. This compared to 1% in 1984 for comparable size smolts.

Smolt Outplant Monitoring

On March 25, a group of spring chinook salmon reared at McCall Hatchery was stocked in the Salmon River (water temperature at 40 F) at Sawtooth Hatchery. These fish were in excellent condition at the time of planting and no descaling was noted. After planting through the 1,200 foot hatchery pipe used for such stocking, a sample size of 217 fish was again checked for descaling. No chinook were considered descaled.

On March 26, a group of steelhead "B" strain reared at HNFH was planted in the East Fork of the Salmon River (water temperature 40 F). Of 100 fish checked from the truck, 3% were considered descaled. A sample of different groups of 100 fish checked after passage through the pipe revealed 2% descaling. It was considered that there was no significant change in the descaling rate as a result of stocking steelhead through the system used at the East Fork trap.

Table 2. Estimated total angler hours, harvest, and harvest rates, and mean total length for residualized steelhead for the upper Salmon River, Idaho, 1985.

Census interval	Angler hours	Mean length (in)	Residualized steelhead harvested	Harvest rate (fish per hour)
5/25 - 6/21	13,612	9.0	10,678	0.78
6/22 - 7/23	25,910	9.2	4,412	0.17
Totals	39,522	9.0	15,090	0.38

All tagged groups (six) of steelhead smolts were monitored for total length (Appendix A). Mean total length of all groups was 8.4 in. A total of 270,208 "B" steelhead smolts were planted in the East Fork Salmon River and 308,103 "A" steelhead smolts were planted in Hazard Creek between March 24 and April 29, 1985.

Stream Surveys

Allison Creek

This creek is a small tributary of the Salmon River with its headwaters located on the south side of Nut Basin in Idaho County. A small hydropower facility has been proposed for Allison Creek (Hydroproject FERC #7383). Mean width is approximately 6 feet, and mean depth is between 9 and 12 inches. Substrate consists of embedded gravel, cobble, and small boulders. Spawning gravel is limited. There were some pools created by windfalls. Water temperatures ranged between 41 F on April 24, 1985 to a high of 57 F on May 5, 1985 with mean temperature 48 F. There was a large sandy staging area at the mouth of Allison Creek with the depth influenced by the Salmon River.

Approximately 100 feet above the confluence was a road culvert with a fish ladder installed by the Forest Service within the past three years. There was a plunge pool 2.5 feet deep below the culvert. There was a 6.7 foot irrigation diversion with no jump pool at mile 1.0 above the confluence. Fish passage is apparently prohibited beyond this point during parts of the year (Fig. 2).

My recommendation is to evaluate anadromous fish stocking due to fish passage problems beyond 1.0 mile of stream.

Slate Creek

Slate Creek is a tributary of the Salmon River. It is 13.5 miles from the confluence with the Salmon to the confluence with Little Slate Creek which doubles the water volume in Slate Creek. An environmental assessment report was developed by the USFS, Nez Perce National Forest (Anonymous 1980). Hydropower projects, FERC #7384 and FERC #7379, have been proposed for Little Slate Creek. Average width is between 30 and 40 feet, and mean depth was unknown. It had a moderately high gradient with substrate of large and small boulders, cobble, and some gravel. Numerous plunge pools and back water pools occurred along the stream. There are a few large riffle areas and a few large glide and run areas. Above the North Fork Campground, the creek braids in a few locations. The number of channels varies between two and four. Substrate at these locations consisted of cobble and gravel. Water temperatures ranged between 40 F on May 5 to a high of 50 F on May 16. Mean temperature was 46 F.

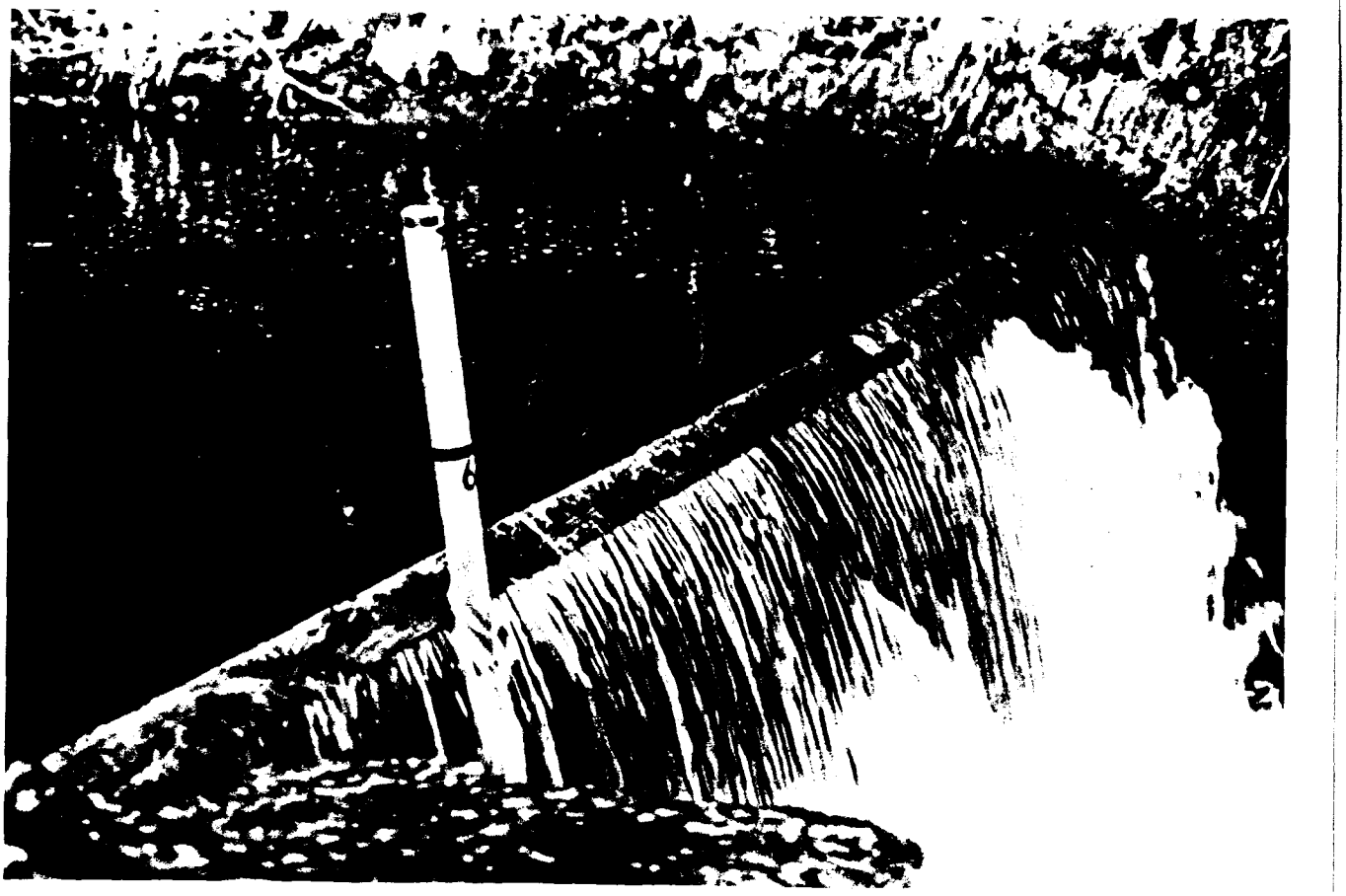

Figure 2. Barrier to upstream migration to Allison Creek, tributary to the Salmon River, Idaho.

Little Slate Creek

Approximately 500 yards above the confluence with main Slate Creek, the stream braids into three channels and appears to have potential as spawning habitat, although, no redds were observed. The headwaters of this creek begin in Little Slate Saddle. The stream flows through a five mile long meadow that has excellent potential to provide spawning habitat but needs some habitat restoration. This area is heavily silted.

My recommendation is to rehabilitate potential spawning area and stock presmolt steelhead in the meadow to re-establish the steelhead run.

Lake Creek

The mouth of Lake Creek fans out and flows through large boulders. The main channel is narrow and shallow. Mean width of the stream is between 10 and 15 feet. It has a high gradient with a series of cascades and small pools. No spawning habitat was observed in the first mile of stream. At mile 1, a 7-foot water fall with a 3 to 4 foot deep plunge pool appears to be a barrier to fish passage. Potential spawning habitat occurs above the barrier.

My recommendation is to investigate the removal of the barrier.

Partridge Creek

The mouth of this stream fans out and flows through large boulders. The main channel is narrow but deep. It has a high gradient with several small pools and cascades. No spawning habitat was observed. Stream width averaged between 10 and 15 feet.

This stream has low potential for an outplant site.

Elkhorn Creek

This stream fans out at the mouth. Width of stream is 6 to 8 feet. There is a very high gradient with boulders and cascades as the dominant feature.

This stream has poor potential as an outplant site.

French Creek

The first mile of stream consists of small cascades and large pools and a moderate to high gradient. Stream width was 15 to 20 feet. No spawning habitat was observed.

The stream has good potential for an outplant site, but needs further investigation. Its location would provide a good site for a terminal fishery.

Stream Surveys - Summary

Little change to the natural habitat has occurred on Lake, Partridge, Elkhorn, and French creeks. The confluences of Lake, Partridge, and Elkhorn creeks fan out through large boulders with a steep gradient into the Salmon River and would probably be unsuitable for the reproduction of a steelhead run, although Lake and Partridge creeks may be suitable as sites to plant smolts with the purpose of providing fish for the fishery in the Riggins area. Of the four streams surveyed, French Creek, has the best potential for an outplant site to establish a reproducing run of steelhead, although the steep gradient may be a potential problem. A forest fire in 1985 may have adverse effects on French Creek so additional habitat information will be necessary. There have been hydroelectric power projects proposed for Lake, Partridge, Allison, and Little Slate creeks.

Adult Steelhead and Redd Counts

There were only two sightings of steelhead adults in Slate Creek. The first sighting occurred May 19 approximately 100 yards above Trough Creek, a tributary of Slate Creek. There were three to five adults observed constructing a redd and spawning in a side channel. Origin, wild or hatchery, could not be determined.

The second sighting occurred on June 2, 1985 approximately 0.45 miles upstream from Trough Creek. At this point, Slate Creek divided into two channels, a main channel and a smaller side channel. Two wild adult steelhead were observed constructing a redd and spawning on the left side of the side channel. Due to the lack of moisture, this redd eventually dried out.

There were no sightings of adult steelhead in Allison Creek, nor were there any signs of redd construction.

Juvenile Density Counts

The majority of stream habitat in Slate Creek study sections was pocket water (Table 3). The gradients of the study sections ranged from 0.5% to 5%.

In Slate Creek, the number of steelhead parr per 100 square yards ranged from 4.3 in section 4 to 76.5 in section 5. The mean number of steelhead parr per 100 square yards was 18.8 (Table 4). Other species observed included mountain whitefish (Prosopium williamsoni), bull trout (Salvelinus confluentus), and brook trout (Salvelinus fontinalis). Only three age 0 chinook salmon were observed in section 2. Two adult chinook were observed in sections 2 and 4.

The major stream habitat in Whitebird Creek was pocket water with a few pools and riffles. The gradients for sections 1, 2, and 3 were 3.5%, 4.0%, and 1.0%, respectively (Table 5). The number of steelhead parr per 100 square yards was 25.9, 57.3, and 20.5 for study sections 1, 2, and 3, respectively (Table 6).

Little Salmon River - Residualism

A total of 188 residualized steelhead smolts were measured from May 25 to June 25, 1985. Mean total length was 8.7 in. Twenty-seven percent of these smolts had adipose and left pelvic fin clips; mean length was 9.0 in. One hundred thirty-eight smolts (73%) had just an adipose fin clip; mean length was 8.6 in.

Hatchery Oversight

McCall Hatchery

The summer chinook salmon reared at McCall Hatchery were released at the Knox Bridge on the South Fork of the Salmon River in April (Table 7). Of the 564,405 smolts released, 78,200 had received adipose fin clips and coded wire tags for contribution evaluations. A total of 38,100 with tag code 10/25/18 were released and 40,100 with tags 10/26/83. Also, of the fin clipped fish, 25,600 received an R.D. "R"-3 freeze brand. These fish had a 91.78% eye-up, and 85.93% survived to release. Design capacity at full production calls for a release of 1,000,000 smolts at 15 to 20 per pound.

All of the fish were in excellent health at the time of release. The summer chinook were 19.1/lb. and 5.2 in. fork length. The spring chinook were 22.6/lb. and 4.8 in. fork length. Both types of chinook were sampled for incidence of various diseases two months prior to release. Infectious pancreatic necrosis was found in the summer chinook, and bacterial kidney disease was found in both stocks. However, samples taken immediately prior to release showed negative for

Table 3. Description and location of study sections on Slate Creek.

Section	Location	Length (yards)	Mean width (yards)	Area (yd^2)	Gradient %	Substrate	Stream habitat	Major Land use	Streamside vegetation
1	Begins at 2nd bridge 200 m upstream from confluence w/Salmon River	260	12.5	2,631	2.5	Boulder 6-23 in., cobble	Pocket water, run, 1 pool, 1 riffle	Residential small grazing and farming	Cottonwood dogwood, hawthorne, alder
2	Slate Creek – begins 200 m above Trough Creek	89	14.0	1,151	1.0	Boulders 9 in. cobble and gravel	Run with 1 small pool	Timbering and recreation	Willow, fir, pine, alder
3	Main Slate Creek begins at bridge 30 m above confluence of Little Slate Creek	108	9.1	899	5.0	Boulder 4-40 in., cobble and gravel	Pocket water	Timbering and recreation	Fir, pine, hawthorne, serviceberry
4	Little Slate Creek ends at foot bridge on trail #301	159	11.7	1,714	2.5	Boulder 4-68 in., cobble	Pocket water	Timbering recreation	Fir, pine, yew, alder, dogwood
5	Little Slate Creek begins at confluence with Victor Creek Little Slate Meadow	94	2.8	244	0.5	Sand, silt, some gravel	Run and pools	Heavy grazing, timbering and mining	Fir and pine

Table 4. Juvenile steelhead density counts for Slate Creek, 1985.

Section		Length (in.) 0-3	>3-6	>6-9	>9-12	>12-14	Total
1	Number of fish present	20	75	12	4		111
	Fish per 100 yard^2	0.8	3.1	0.5	0.2		4.5
2	Number of fish present	32	11	6	0		49
	Fish per 100 yard^2	3.0	1.0	0.6	0		4.6
3	Number of fish present	23	19	1	0		43
	Fish per 100 yard^2	2.7	2.3	0.1	0		5.1
4	Number of fish present	38	27	3	1		69
	Fish per 100 yard^2	2.4	1.7	0.2	0.1		4.3
5	Number of fish present	78	25	0	0		173
	Fish per 100 yard^2	30.9	34.5	11.1	0		76.5

Table 5. Description and Location of study sections on Whitebird Creek.

Section	Location	Length (yards)	Mean width [yards)	Area (yd^2)	Gradient	Substrate	Stream habitat	Major land use	Streamside vegetation
1	N. Fork Whitebird Cr., at confluence with S. Fork Whitebird Cr.	102	6.4	605	3.5	Small boulder and cobble	Pocket water	Grazing	Hawthorne, cottonwood, alder, pine
2	S. Fork Whitebird Cr. 100 m upstream from confluence with N. Fork Whitebird	93	5.6	501	4.0	Small boulder and cobble	Pocket water	Grazing	Hawthorne, cottonwood, pine, alder
3	S. Fork Whitebird Cr. at Twin Cabins – 200 m downstream	121	7.6	847	1.0	Silt and cobble	Run and pool	Timbering	Pine, fir

Table 6. Juvenile steelhead density counts for Whitebird Creek, 1985.

Section		Length (in.) 0-3	>3-6	>6-9	>9-12	>12-14	Total
1	Number of fish	36	107	2	0	0	145
	Fish per 100 yard^2	6.0	19.1	0.4	0	0	25.6
2	Number of fish	112	95	53	6	0	266
	Fish per 100 yard^2	24.1	20.4	11.4	1.3	0	57.3
3	Number of fish	9	88	61	3	0	161
	Fish per 100 yard^2	1.1	11.2	7.8	0.4	0	20.5

Table 7. McCall Hatchery summer chinook salmon production for the South Fork Salmon River.

Brood year	Number of smolts released	Number per pound	Release dates	Rearing history
1978	124,800	13.0	April 21-23, 1980	Adults trapped at Little Goose Dam, spawned at Rapid River Hatchery, eggs shipped to Mackay and McCall hatcheries, McCall fish transferred to Mackay due to construction, fish
1979			April 6-7, 1981	About 50% of the fish were from adults trapped at Lower Granite Dam and spawned at Dworshak NFH, eyed eggs transferred to McCall. The rest were from fish spawned at the SFSR facility and shipped to McCall Hatchery.
1981	183,896	20.3	April 4-7, 1983	Adults trapped and spawned at SFSR facility, eggs and fish reared at McCall Hatchery.
1982	269,880	15.6	April 9-11, 1984	Same as 1981.
1983	564,405	19.1	April 1-4, 1985	Same as 1981.

IPN virus. No other infectious pathogens were found, and very little mortality was experienced at this time.

The summer chinook salmon run to the South Fork trap in 1985 was the largest since the trap was installed (Table 8). A total of 2,237 adults and Jacks returned. Four hundred seventy-seven females were spawned to give 2,002,475 eggs. We had 1,552,000 eggs eye-up for a 77.5% eye-up percentage. Four coded-wire tagged groups returned to the South Fork trap in 1985 (Table 9). Control groups and vaccinated groups appeared to yield similar returns. A chi-square test of return $x^2.05(1)$ revealed no significant difference in returns for tag groups 10/24/12 and 10/24/13.

The 1984 brood year resulted in 1,225,000 eyed summer chinook salmon eggs. These fish are currently in excellent shape with an 87.4% survival rate from eye-up to 30.4 fish per pound size (4.1 in.). Fifty thousand seven hundred and eighty-five of these fish received adipose fin clips and coded wire tags, and of the tagged fish, 43,487 also received a R.D. "Y"-3 freeze brand.

The spring chinook salmon reared at McCall Hatchery were released at the Sawtooth Hatchery site on the Salmon River. Of the 420,060 smolts released in March, 79,350 had received adipose fin clips and coded wire tags (41,200 10/26/34; 38,150 10/26/35). Also, of the fin clipped fish, 39,875 had received a R.D. "R"-1 freeze brand. These fish had an 82.8% eye-up and a 48% survival from eye-up to release.

Dworshak National Fish Hatchery

A total of 1,137,139 spring chinook salmon were released from Dworshak National Fish Hatchery in 1985 (Table 10). Design capacity at full production calls for 1,050,000 smolts released at 15 to 20 per pound. All fish were released into the main stem Clearwater River after dark on April 3-4 to prevent possible predation problems. Cooperation with the Reservoir Control Center allowed higher North Fork Clearwater flows from 6 to 12 p.m. each night to flush smolts downriver. By April 5, Idaho Department of Fish and Game personnel reported approximately 600,000 smolts past the Clearwater smolt monitoring trap near Lewiston.

This year's program utilized two chinook stocks started on feed at Dworshak. Once fish were transferred to raceways, a strict rearing regimen was adopted to ensure optimum fish size and health at release. Periodic fish health exams conducted by the Dworshak Fish Health Center showed little BKD incidence or mortality to release. Length frequency analysis indicated a normal population with little size variation observed. Overall, fish quality was judged to be excellent.

Approximately 40,000 chinook were freeze branded (R.D. "R"-l) on March 27 as part of the water budget program. All remaining fish were not marked.

Table 8. Trapping summary of adult summer chinook salmon on the South Fork Salmon River.

Year	Weir installed	Weir removed	Males		Females	Total	Released upstream	
			1-ocean	2- & 3-ocean			Males	Females
1980	July 19	September 10	186	148 (80)[a]	46 (161)[a]	380 (241)[a]	209	21
1981	July 8	September 14	124	206	194	524	167	60
1982	July 20	September 7	48	306	196	550	112	45
1983	July 12	September 4	505	192	240	937	161	55
1984	July 9	September 5	595	431	503	1,529	213	124
1985	June 19	September 10	828	514	895	2,237	373	400

[a]Summer chinook salmon trapped at Lower Granite Dam and held at Dworshak National Fish Hatchery.

Table 9. Coded wire tag returns for marked groups of summer chinook salmon returning to the South Fork Salmon River.

Tag code	Year released	Number tagged released	Number per pound	Purpose	1982 returns		1983 returns		1984 returns		1985 returns		Total returns	Percent
					SFSR trap	Others	SFSR trap	Other[a]	SFSR trap	Others	SFSR trap	Other[a],[b]		
10/21/17	1981	40,450	17.5	Control	6	0	28	0	10	0	0	0	44	0.109
10/21/18	1981	40,850	17.5	Vibriosis Vaccination	3	0	18	0	21	0	0	0	42	0.103
10/21/28	1981	47,625	17.5	Placebo Vaccination	5	0	20	0	15	0	0	0	40	0.084
10/24/12	1982	40,775	20.0	Vibriosis Vaccination	--	1	182	2	205	0	433	0	823	2.018
10/24/13	1982	40,500	20.0	Control	--	2	172	2	188	0	395	0	759	1.874
10/24/58	1983	62,100	20.3	Hatchery Evaluations	--	--	--	--	126	0	468	0	594[b]	0.957
10/27/38	1984	50,000	15.8	Hatchery Evaluations	--	--	--	--	--	--	117	0	117[b]	0.234

[a]Includes known commercial, sport, and Indian harvest, and other trapping sites.

[b]Additional returns expected in future.

Table 10. Release dates for DNFH reared spring chinook salmon (brood year 1983).

Release date	Stock/ lot number	Number	Size (No./ lb)	Weight (lbs)	Mean fork length (in.)	Condition factor K (10^{-6})
April 3-4	Little White/ 3-LW-2a	57,513	14.41	3,992	5.7	8.43
April 3-4	Little White/ 3-LW-2b	713,835	23.53	30,338	4.8	8.00
April 3-4	Leavenworth/ 3-Le-2	365,791	20.74	17,636	5.0	8.05
Totals		1,137,139	21.88	51,966	5.2	8.16

A total of 334 adult chinook salmon returned to Dworshak National Fish Hatchery in 1985. None of these fish were coded wire tagged. Smolts have not been coded wire tagged at Dworshak National Fish Hatchery to date for the LSRCP program. Spawning occurred from August 19 through September 6.

Sawtooth Fish Hatchery

In January of 1985, hatchery personnel moved approximately 55,000 spring chinook fry into the hatchery vats. The remaining 1984 brood year fry, a total of 517,603, were received by the end of April from the Pahsimeroi Hatchery which incubated, hatched, and early reared these fry from eggs taken at the Sawtooth and East Fork sites. A total of 341,324 Sawtooth and 112,008 East Fork fish will be released in the spring of 1986. Eighty-one thousand of the Sawtooth group have been tagged, and 38,000 of these have been branded for future studies.

As mentioned previously in this report, in March of 1985 McCall Hatchery planted 420,060 chinook smolts at the Sawtooth site from brood year 1983 (Table 11). These included 79,350 fish with adipose clips and coded wire tags (tag 10/26/34--41,200 released and tag 10/26/35--39,513 released). In addition, Hagerman National Hatchery planted 784,096 steelhead "A" smolts at the Sawtooth site and 270,208 steelhead "B" smolts at the East Fork site.

We began trapping adult steelhead in April of 1985 at both the Sawtooth and East Fork facilities (Table 12). Five hundred twenty-six steelhead were trapped at the Sawtooth site, which provided 1,516,294 green "A" eggs and 102,461 green "B" eggs. The East Fork facility trapped 77 adult steelhead for a green egg take of 122,612 "A" eggs and 7,128 "B" eggs. We shipped 1,102,079 eyed "A" eggs and 601,419 eyed "B" eggs to Hagerman National Hatchery for rearing. Pahsimeroi Hatchery also sent a total of 2,613,679 green "A" eggs, of which 2,219,772 were planted as button-up fry in the upper Salmon River tributaries. Pahsimeroi also sent 619,130 green "B" eggs, which were included with shipments of "B" eggs to Hagerman National Hatchery.

Spring chinook salmon trapping began in June this season with a total of 1,639 adults trapped at Sawtooth and 303 adults trapped at the East Fork facility (Table 13). Adults trapped at Sawtooth included: 296 jacks, 1,151 four year olds, and 192 five year old fish. Adults trapped at the East Fork included: 31 jacks, 213 four year olds, and 59 five year old fish. We spawned 313 females at Sawtooth for a green egg take of 1,367,344. There were 44 females spawned at the East Fork site for a total green egg take of 244,498. Additional eggs from Rapid River Hatchery were received at Sawtooth.

The 1984-85 coded wire tag data for Sawtooth Hatchery and East Fork trap are listed (Table 14). All groups should have additional returns in 1986.

Table 11. Summary of fish released by Sawtooth Hatchery, 1985.

Species	Brood year	Mark	Total marked released	Size at release (per/lb.)	Date(s) released	Release site	Total release	Marked group code and season
Spring chinook	1983	Ad/CWT	41,200	22.5	3/25-29	Sawtooth Hatchery		10/26/34 Hatchery Evaluations
Spring chinook	1983	Ad/CWT	38,150	22.5	3/25–29	Sawtooth Hatchery		10/26/34 Hatchery Evaluations
Spring chinook	1983	RD "R"–1	39,875	22.5	3/25–29	Sawtooth Hatchery		Water budget
Spring chinook	1983			22.5	3/25-29	Sawtooth Hatchery	300,835	
Steelhead A	1985			2,300	7/1-22	Yankee Fork Creek	250,000	
Steelhead A	1985			2,300	7/1–22	Alturas Lake Creek	181,420	
Steelhead A	1985			2,300	7/1-22	Valley Creek	128,092	
Steelhead A	1985			2,300	7/1-22	Redfish Lake Creek	164,379	
Steelhead A	1985			2,300	7/1-22	Pole Creek	488,437	
Steelhead A	1985			2,300	7/1-22	West Fork Yankee Fork Creek	250,985	
Steelhead A	1985			2,300	7/1-22	Frenchman Creek	103,474	
Steelhead A	1985			2,300	7/1-22	Upper Salmon River	503,170	
Steelhead A	1985			2,300	7/1-22	Basin Creek	118,203	
Steelhead B	1985			2,300	7/1-22	East Fork	31,612	
						Total chinook smolts	420,060	
						Total steelhead fry	2,219,772	

Table 12. Adult return summary for anadromous fish released by Sawtooth Hatchery, 1985.

Species	Recapture location	Males	Females	Total	Released upstream Males	Females
Spring chinook	Sawtooth Hatchery	1,082	557	1,639	445	180
Spring chinook	East Fork trap	240	63	303	124	18
Steelhead	Sawtooth Hatchery	149	377	526	114	92
Steelhead	East Fork trap	43	30	77	--	--

Table 13. Trapping summary of spring chinook salmon on the Salmon River at Sawtooth Hatchery.

Year	Weir installed	Weir removed	Males		Females	Total	Released upstream	
			1-ocean	2- & 3-ocean			Males	Females
1981	June 25	September 9	23	257	449	729	--	255
1982	June 29	September 26	16	135	111	262	--	12
1983	July 19	September 6	17	170	179	366	78	19
1984	July 7	September 6	76	142	187	405	140	65
1985	June	September	296	786	557	1,639	445	180

Table 14. Summary of 1984–85 coded wire tag returns for Sawtooth Hatchery and East Fork trap area releases.

Species	Tag code	Marks released	Size at release (per/Lb.)	Date released	Release site	Purpose	Returns					Percent return
							Fall 1984 harvest	Spring 1985 harvest	Release site 1984	Release site 1985	Total return	
Steelhead "A"	5/13/33	40,573	2.1	April 18 20, 1983	Salmon River above Sawtooth	"Size at release" Large x = 10.2 in.	16	10		17	43[a]	0.11
Steelhead "A"	5/13/34	40,548	5.3	April 18–20, 1983	Same as above	"Size at release" small x = 8.2 in.	7	0		2	9[a]	0.02
Spring chinook	10/24/8	35,075	28.7	March 29, 1983	Same as above	Hatchery evaluations			2	50	52[a]	0.14
Spring chinook	10/25/35	51,450	28.7	March 29, 1983	Same as above	Hatchery evaluations			2	68	70[a]	0.14
Spring chinook	10/27/8	51,025	17.0	March 27, 1984	Same as above	Hatchery evaluations				83	83[a]	0.16
Spring chinook	10/27/9	50,600	17.0	March 27, 1984	Same as above	Hatchery evaluations				71	71[a]	0.14
Steelhead "B"	10/24/60	37,600	3.6	April 12–13, 1983	E. Fork Salmon River	Stock evaluation	0	0		3	3[a]	0.01

[a]Additional returns expected in the future.

Magic Valley Steelhead Hatchery

No fish were reared at the hatchery this year. The hatchery water was turned off at the request of the Corps of Engineers to allow the water table to reach its natural level for hatchery design and construction. Fish will most likely not be reared here until late fall of 1986 or spring of 1987 depending upon construction progress.

During the 1984-85 fish year, Hagerman National Fish Hatchery reared 232,000 steelhead in lieu of the Magic Valley Hatchery Program (Table 15). These fish were reared in the trout section of Hagerman National Fish Hatchery. This process will continue until such time as Magic Valley Steelhead Hatchery begins production.

Hagerman National Fish Hatchery

The distribution of brood year 1984 "A" and "B" steelhead was completed on May 1, 1985 (Table 16). A total of 1,364,496 steelhead smolts at 4.4 per pound were planted. These include the 232,000 steelhead reared for Magic Valley Steelhead Hatchery. The planned production was 1,412,000 smolts at 4.1 per pound. Actual distribution was short 3% on numbers and 10% on weight. A total of 128,229 fall chinook at 48.9 per pound were planted in the Snake River near the Grande Ronde. Included in this group were 56,327 with coded wire tags (5/13/53).

Table 15. Numbers and pounds of steelhead reared at Hagerman National Fish Hatchery for Magic Valley Steelhead Hatchery program, 1985.

Strain	Number	Pounds	Fish per pound	Planting site	Date planted
A	133,099	29,415	4.5	Salmon River at Sawtooth H.	March 26-April 5
A	89,688	21,625	4.2	L. Salmon at Hazard Creek	April 15-May 1
B	9,204	1,950	4.7	E. Fork Salmon River	April 29
Total	231,991	52,990	Avg 4.34		

Table 16. Summary of fish released by Hagerman National Fish Hatchery, 1985.

Species	Stock	Brood year	Release site	Release date	Number released	Number per lb.	Marks	Marks release
Fall chinook	Snake River	1984	Snake River	6/4/85	128,229	48.9	5/13/53 FB	56,327
Fall chinook	Snake River	1984	Snake River	6/4/85		48.9	L.D. "R"-4	33,700
Steelhead A	Hells Canyon	1984	Hazard Creek	4/25/85 to 5/1/85	308,103	4.2	10/26/32	39,175
Steelhead A	Sawtooth Hatchery	1984	Sawtooth	4/9/85 to 4/24/85	786,186	4.4	10/26/30	40,475
Steelhead A	Sawtooth Hatchery	1984	Sawtooth	4/9/85			FB R.D. "Y"-1	35,125
Steelhead B	Salmon River	1984	East Fork Salmon	3/26/85 to 4/29/85	270,207	4.8	10/26/55	17,425
Steelhead B	Salmon River	1984	East Fork Salmon	4/10/85 to 4/12/85			10/26/31	39,375
Steelhead B	Salmon River	1984	East Fork Salmon	4/10/85 to 4/12/85			10/26/36	35,225
Steelhead B	Salmon River	1984	East Fork Salmon	4/10/85 to 4/12/85			10/28/2	25,050
Steelhead B	Salmon River	1984	East Fork Salmon	4/10/85 to 4/12/85			10/28/3	
Steelhead B	Salmon River	1984	East Fork Salmon	4/29/85			10/28/54	25,525

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A P P E N D I X

Appendix A. Information on coded wire tagged groups of steelhead released by Hagerman National Fish Hatchery, 1985.

Strain	Tag group	Release date	Release location	Number released	Mean length (in.)	Sample size	Reason for mark
B	10/26/55	March 26	East Fork	17,425	8.1	203	Early-release "Time-of-release"
A	10/26/30	April 9	Sawtooth Hatchery	40,475	8.4	344	Return-to-site
B	10/26/31	April 10	East Fork	39,375	8.4	300	Control for "Pro Polyaqua" transport study
B	10/26/36	April 10	East Fork	35,225	8.4	300	"Pro Polyaqua" transport study
B	10/28/2	April 12	East Fork	25,050	8.4	312	Mid-release "Time-of-release"
B	10/28/54	April 29	East Fork	25,525	8.3	312	Late release "Time-of-release"

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